

Shale Gas: Our Future

Shale gas is natural gas stored in organic-rich, very fine-grained rocks such as shale, mudstone or laminated siltstones. In the past, technical challenges and cost issues deterred shale development; however, recent advancements in technology make it possible to develop shale resources efficiently and economically.

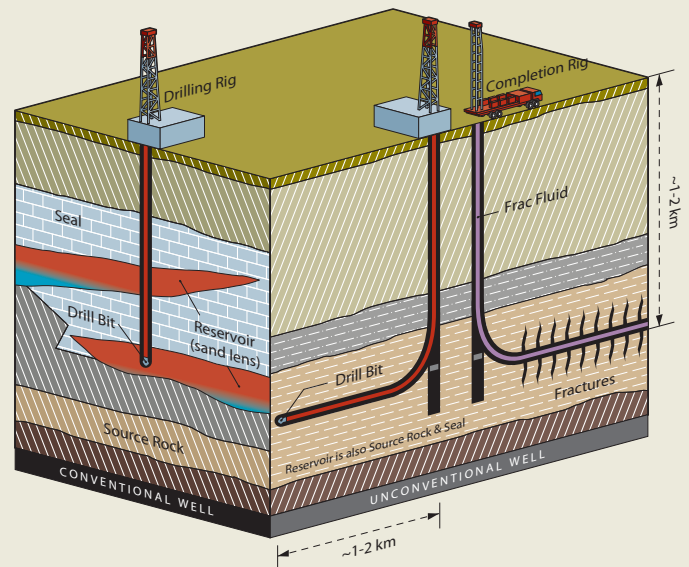


What is the Difference between Conventional and Unconventional ('Shale') Gas?

Unconventional gas is trapped differently in rocks from conventional gas and different methods are needed to produce each type of gas.

In conventional gas fields, natural gas migrates from source rock to reservoir rock to form pockets of trapped gas. Gas producers drill into these pockets and the gas moves into the wellbore.

In shale reservoirs, the permeability (the ability for hydrocarbons to flow) of the rock is very low and gas producers must stimulate the rock through hydraulic fracturing to create enough permeability to allow the gas to flow to the wellbore.



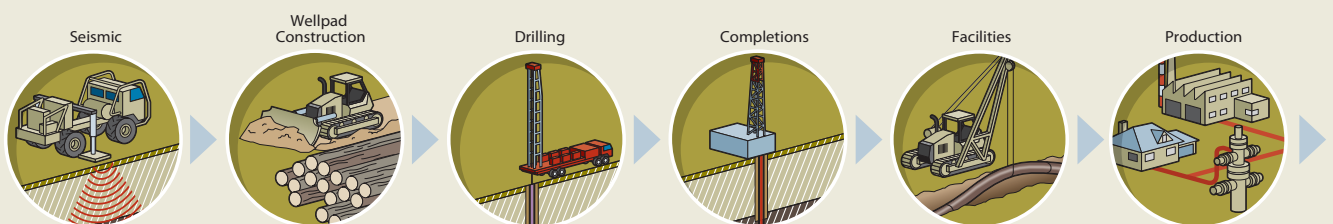
How are the Wells Drilled?

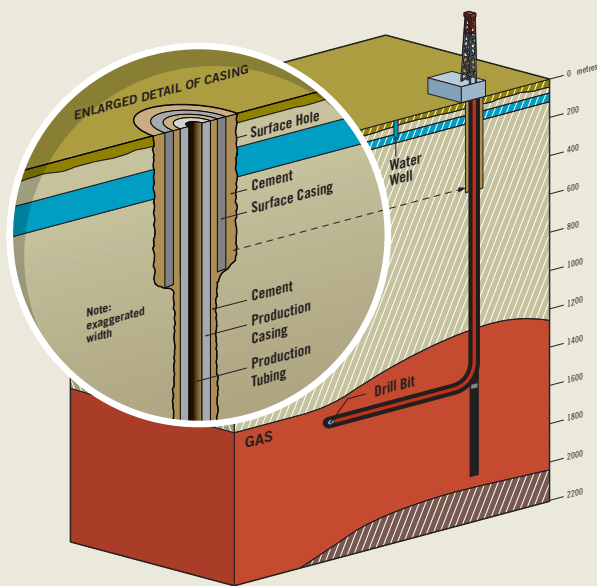
The majority of shale plays are drilled horizontally. Horizontal drilling begins with a vertical well drilled 1-2 kilometres below the surface. The drill bit makes a gradual 90° turn and continues drilling horizontally through the reservoir for an additional 1-2 kilometres.

The long horizontal well reduces disturbances above ground and increases wellbore exposure to the shale rock, increasing the expected ultimate recovery (EUR) of natural gas contained within the shale formation.

Well Completions

Once drilling has finished, a completions rig and equipment move onto the well site to fracture ('frac') the well. Fracturing involves injecting frac fluid, comprised of mostly water and sand, at high pressures in order to loosen the rock and allow trapped gas to flow into the wellbore. Once fracturing is complete, each horizontal leg is flowed back to recover some water and 'plugged' to isolate the previously fraced well.





Drinkable water wells are much shallower than shale deposits and are typically located between 50-100 metres in depth.

Water Use and Disposal

Water use and improving efficiency in our fracing operations is a major focus of Talisman's environmental planning. The company is researching ways to reduce usage of potable water and reusing flowback water (which returns back up the wellbore) for subsequent frac operations.

Across our shale operations, Talisman currently transports flowback to wastewater treatment facilities. We are also researching water treatment technology for on-site purification and deep well disposal.

Groundwater Protection

Groundwater aquifers are underground formations comprised of coarse, permeable sediments or rocks, with water migrating from the surface and flowing underground into the formation.

To protect groundwater, Talisman sets and cements a steel pipe called surface casing into the wellbore through the depth of the water aquifer. The cemented surface casing is used to keep the wellbore stable and protect the groundwater from drilling activity.

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In Canada, Talisman has a long history and experience of drilling natural gas wells, ensuring the integrity of its drilling operations. Talisman follows industry best practice standards for cement casing.

On average 99.5% of frac fluids are comprised of water and sand, injected into deep shale gas formations.

99.5%
WATER AND SAND

Environment

Across our shale operations, Talisman works hard to minimize its environmental footprint. Environmental planning is a key component in the company's overall development plans. Before activities begin, Talisman evaluates all locations for environmental sensitivities and sites are selected to minimize disturbance. We reduce our operational footprint by using multi-well pads, short access roads and common corridors for pipelines, utilities and roads. We take an integrated approach to land management, working with other industries (forestry, mining, etc.) to reduce cumulative impact on the region.

